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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,429	12/10/2003	Hako Botma	081468-0306942	5136
909	7590	06/29/2005	EXAMINER	
PILLSBURY WINTHROP SHAW PITTMAN, LLP			GUTIERREZ, KEVIN C	
P.O. BOX 10500			ART UNIT	
MCLEAN, VA 22102			PAPER NUMBER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

EK

<b>Office Action Summary</b>	<b>Application No.</b> 10/731,429	<b>Applicant(s)</b> BOTMA ET AL.	
	<b>Examiner</b> Kevin Gutierrez	<b>Art Unit</b> 2851	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>April 15, 2004</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Specification*

1. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

2. The abstract of the disclosure is objected to because the inappropriate use of the terms "said" and "means" within the context of the abstract. Correction is required. See MPEP § 608.01(b).

### *Claim Objections*

3. Claim 5 is objected to because of the following informalities: <sup>said</sup> "mirror elements" lacks proper antecedent basis.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

Art Unit: 2851

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 10, 11 and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Shinoda (US 2002/0001134).

Regarding claim 10, Shinoda teaches “producing a beam of radiation having a predetermined polarization state (Paragraph 0043, lines 5-7), directing the beam of radiation to an illumination system (Figure 1, ref.# 15-21), the directing being performed such that polarization-related radiation losses are reduced (Paragraph 0047, lines 2-3 and lines 4-6), patterning the beam of radiation according to a desired pattern (Paragraph 0044, line15); and projecting the patterned beam of radiation onto at least a portion of a radiation sensitive layer on a substrate (Paragraph 0044, lines 16-17).”

Regarding claim 11, Shinoda teaches “further comprising arranging said beam to have an s-polarisation state relative to redirecting elements used (Paragraph 0047, lines 15-17, see figure 1, dash-dot lines are redirected by refs#. 11 and 14).”

Regarding claim 13, “a plurality of redirecting elements (Figure 1, refs.# 11-14) to redirect to direct a beam of radiation having a predetermined polarization state from a radiation source (Paragraph 0043, lines5-7) to an illumination system (Figure 1, ref.# 15-21) of the lithographic apparatus, the redirecting elements (Figure 1, refs.# 11-14) being arranged to provide a minimum polarization related radiation loss (see Paragraph 0047, lines 2-3 and lines 4-6).”

Regarding claim 14, Shinoda teaches “wherein the beam and redirecting elements are mutually arranged such that the beam has a substantially s-polarization state relative to at least of the directing elements (Paragraph 0047, lines 15-17, see figure 1 where the dash-dot lines have an s-polarization, indicated by horizontal solid lines with two opposed arrows at each end, before and after ref.# 11).

Regarding claim 15, Shinoda teaches “wherein said redirecting elements are dielectric mirror elements (Paragraph 0043, lines 14-15) and said beam is arranged to have an s-polarization state relative to each of said mirror elements (Paragraph 0047, lines 15-17, see figure 1 where the dash-dot lines have an s-polarization, indicated by horizontal solid lines with two opposed arrows at each end, before and after refs.# 11 and before 15).”

6. Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by Takahara et al (US 2002/0067546).

Regarding claim 8, Takahara et al teaches a “ mirror element (Figure 10, ref.# 51) comprising a dielectric reflective layer and a polarizing layer (Figure 10, refs.# 51 and 51a) to provide a predetermined polarization state of a radiation beam relative to the reflective layer (Paragraph 0007, lines 8-10), the polarizing layer being integral with said dielectric reflective layer (Paragraph 0006, lines 9-13).”

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda in view of Totzeck et al (US 2004/0184019).

Regarding claim 1, Shinoda discloses “a radiation system to provide a projection beam of radiation (Figure 1, ref# 10-18), the patterning device constructed and arranged to pattern the projection beam according to a desired pattern (Paragraph 044, lines 10-12); a projection system (Figure 1, ref.# 22) to project the patterned beam onto a target portion of the substrate (Figure 1, ref.# 23); said radiation system further comprising: a beam delivery system comprising redirecting elements (Figure 1, refs.# 11-14) to redirect said beam from a radiation source to an illumination system (Figure 1, ref.# 15-21) wherein said radiation source is arranged to provide a beam having a predetermined polarization state and said redirecting elements are arranged to provide a minimum polarization related radiation loss (see Paragraph 0047, lines 2-3 and lines 4-6).” Shinoda does not disclose “a support structure to support a patterning device” and “a substrate table to hold a substrate.”

However, having “a support structure to support a patterning device” and “a substrate table to hold a substrate” is routine in the art as is evident to the teaching of Totzeck et al (see Figure 1, refs.# 6 and 12). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Shinoda by including a support structure and a substrate table.

The ordinary artisan would have been motivated to modify Shinoda in a matter described above for at least the purpose to provide stability of the projection elements.

Regarding claim 2, Shinoda teaches “wherein said redirecting elements are dielectric mirror elements (Paragraph 0043, lines 14-15) and said beam is arranged to have an s-polarization state relative to each of said mirror elements (Paragraph 0047, lines 15-17).”

Regarding claim 3, Shinoda teaches “wherein said beam delivery system comprises at least one polarizing plate (Figure 1, ref. #15) to modify a polarization state of said radiation beam (Paragraph 0047, lines 17-19).”

Regarding claim 5, Shinoda teaches “wherein said polarizing plate (Figure 1, ref. #15) is integral with one of said mirror elements (Figure 1, ref. #14 and col.3, lines 15-19 where the light reflected from mirror and through polarizer changes the light’s polarization state).”

Regarding claim 6, it would have been obvious having one of ordinary skilled at the time the invention was made to “wherein said polarizing plate (Figure 1, ref.# 15) is bonded to one of said mirror elements (Figure 1, refs.#11-14),” since it has been

held that forming in one piece and article which has formerly been formed in two pieces and put together involves only routine skill in the art. *Howard v. Detroit Stove Works*, 150 U.S. 164 (1893).

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over a modified Shinoda in view of Totzeck et al, as applied to claims 1 and 3 above, and in further view of Takahara et al.

Regarding claim 4, the modified Shinoda teaches all of the claimed limitations except a polarizing plate being a half lambda plate.

However, Takahara et al teaches "wherein said polarizing plate is a half lambda plate" (Figure 10, refs.#52 (half-wavelength plate) where a half lambda plate is used to change the state of polarization). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify modified Shinoda by including the polarizing plate being a half lambda plate as taught by Takahara et al for at least the purpose to obtain a beam of a more uniform polarized state.

10. Claim 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda in view of Totzeck et al, as applied to claim 1 above, and in further view of Kakuchi et al (US 2005/0099635).

Regarding claim 7, Shinoda as modified teaches all of the claimed limitations except incident planes of each directing elements are all parallel to each other.



However, having “wherein each of said redirecting elements defines a plane of incidence, and wherein all planes of incidence of all redirecting elements are parallel to each other” is routine in the art as is evident to the teaching of Kakuchi et al (see figure 1, refs.#10, 11 ,21 ,22 ,24 and 25 (redirecting elements with solid lines incident at parallel planes). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify Shinoda by including incident planes of each directing elements are all parallel to each other.

The ordinary artisan would have been motivated to modify Shinoda in a matter described above for at least the purpose to redirect the beam of radiation from a remote location.

11. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takahara et al in view of Totzeck et al.

Regarding claim 9, Takahara et al discloses all of the claimed invention except for “wherein said polarizing layer is a half lambda layer for light having a predetermined wavelength in the range of 248-127 nm.”

However, it having a polarizing layer that is a half lambda layer for light having a predetermined wavelength in the range of 248-127 is well known to the art as taught by Totzeck et al (Paragraph 0037, lines 4-7). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Takahara et al for at least the purpose of using light with shorter wavelengths.

12. Claims 12 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda in view of Leger (5,627,847).

Regarding claims 12 and 16, Shinoda teaches all of the claimed limitations except a substantially square cross-section beam of radiation.

However, having a “wherein the beam of radiation which is directed to the illumination system has a substantially square cross-section” is routine in the art as is evident to the teaching of Leger (see Figure 3B, ref.# 120; Col. 4, lines 15-17). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to modify Shinoda by including a substantially square cross-section beam of radiation.

The ordinary artisan would have been motivated to modify Shinoda in a matter described above for at least the purpose to reduce the number of beam reflections.

13. Claims 17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda in view of Takahara et al.

Regarding claim 17, Shinoda teaches all of the claimed limitations except a polarizer to modify said radiation to an s-polarization state.

However, Takahara et al teaches polarizer to modify said radiation to an s-polarization state (Figure 10, the radiation beam enters ref. 52 (polarizer) and emerges to the right with an s-polarization state). Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further

modify modified Shinoda for at least the purpose to obtain a more uniform polarized beam.

Regarding claim 19, Shinoda teaches “wherein said the radiation system and mirror elements are mutually arranged such that the beam, when provided, has a substantially s-polarization state relative to at least one of the redirecting elements (Paragraph 0047, lines 15-17, see figure 1 where the dash-dot lines have an s-polarization, indicated by horizontal solid lines with two opposed arrows at each end, before and after refs.# 11 (redirecting elements)).”

Regarding claim 20, Shinoda teaches “wherein the beam, when provided, has a substantially s-polarization state relative to each of the redirecting elements (Paragraph 0047, lines 15-17, see figure 1 where the dash-dot lines have an s-polarization, indicated by horizontal solid lines with two opposed arrows at each end, before and after refs.# 11 and before 15).”

14. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shinoda in view of Takahara et al, as applied to claim 17 above, and in further view of Leger.

Regarding claim 18, a further difference between modified Shinoda and the claimed invention is “wherein the beam of radiation which is directed to the illumination system has a substantially square cross-section.”

However, having a “wherein the beam of radiation which is directed to the illumination system has a substantially square cross-section” is routine in the art as is evident to the further teaching of Leger (see Figure 3B, ref.# 120; Col. 4, lines 15-17).

Thus, it would have been obvious to one ordinary skilled in the art at the time the invention was made to further modify modified Shinoda by including a substantially square cross-section beam of radiation.

The ordinary artisan would have been motivated to further modify Shinoda in a matter described above for at least the purpose to reduce the number of beam reflections.

### ***Conclusion***

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fujii et al (5,475,213) discloses an optical information processing element and Berger et al (US 2004/0125374) discloses an apparatus for filtering an input beam and producing an output beam.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Gutierrez whose telephone number is (571)-272-5922. The examiner can normally be reached on Monday-Friday: 7:30 a.m. - 4:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571)-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin Gutierrez  
Examiner  
Art Unit 2851

June 21, 2005



**JUDY NGUYEN**  
**SUPERVISORY PATENT EXAMINER**